

# Securities Clearance and Settlement Systems

## A Guide to Best Practices

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How to assess securities clearance and settlement systems, based on international standards and best practices.

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Latin America and the Caribbean Region  
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and  
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April 2001



## Summary findings

As an essential part of a nation's financial sector infrastructure, securities clearance and settlement systems must be closely integrated with national payment systems so that safety, soundness, certainty, and efficiency can be achieved at a cost acceptable to all participants. Central banks have paid considerable attention to payment systems, but securities clearance and settlement systems have only recently been subjected to rigorous assessment.

The Western Hemisphere Payments and Securities Clearance and Settlement Initiative (WHI), led by the World Bank and in cooperation with the Centro de Estudios Monetarios Latinoamericanos (CEMLA), gave Guadamillas and Keppler a unique opportunity to observe how various countries in Latin America and the Caribbean undertake securities clearance and settlement. To do so, Guadamillas and Keppler developed a practical and implementable assessment methodology covering key issues that affect the quality of such systems.

In this paper they discuss the objectives, scope, and content of a typical securities system, identify the

elements that influence the system's quality, and show how their assessment methodology works. They focus on the development of core principles and minimum standards for integrated systems of payments and securities clearance and settlement.

Their paper fills a gap by providing an evaluation tool for assessors of such systems, especially those who must assess evolving systems in developing and transition economies. Essentially, an assessment involves a structured analysis to answer four related questions:

- What are the objective and scope of a securities clearance and settlement system?
- Who are the participants, what roles do they play, and what expectations do they have?
- What procedures are required to satisfy the participants' needs?
- What inherent risks are involved, and how can they be mitigated at an acceptable cost?

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This paper—a product of the Finance Cluster, Latin America and the Caribbean Region, and Financial Sector Infrastructure, Financial Sector Development Department—is part of a larger effort in the Bank to assess payment systems and securities clearance and settlement systems in Latin America and the Caribbean. Copies of the paper are available free from the World Bank, 1818 H Street, NW, Washington, DC 20433. Please contact Helena Issa, room I5-110, telephone 202-473-0154, fax 202-522-2106, email address [hissa@worldbank.org](mailto:hissa@worldbank.org). Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at [mguadamillas@worldbank.org](mailto:mguadamillas@worldbank.org) or [rkeppler@worldbank.org](mailto:rkeppler@worldbank.org). April 2001. (34 pages)

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# SECURITIES CLEARANCE AND SETTLEMENT SYSTEMS

## A guide to Best Practices

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#### ACKNOWLEDGEMENT

The ideas presented in this paper are a by-product of our involvement in the WHI, although they are ours and therefore do not represent the WHI position or the position of any institution participating in the WHI. However, we are grateful for the contribution of our colleagues in the core team of the Initiative, the International Advisory Council (IAC) members, country authorities (central banks and securities regulators) representatives from the Latin American and Caribbean Region and staff of private institutions visited in the context of the Initiative. We want to thank our colleagues in the World Bank, Massimo Cirasino, Fernando Montes-Negret and Augusto de la Torre for their valuable comments. We are also grateful for the contribution of our colleagues in the field, Iñigo de la Lastra (Comisión Nacional del Mercado de Valores, Spain), Ester Saverson (US Securities Commission), Eija Holtinnen (Finland Securities Regulator), and Andrea Salas (Comisión Nacional de Valores, Argentina) that contributed to the development of the methodology and provided specific comments on several aspects covered in the paper.

## GLOSSARY OF ACRONYMS

<b>BIS</b>	Bank for International Settlements
<b>CEMLA</b>	Centro de Estudios Monetarios Latinoamericanos
<b>CNMV</b>	Comisión Nacional del Mercado de Valores, Spain
<b>CNV</b>	Comisión Nacional de Valores, Argentina
<b>COSRA</b>	Council of Securities Regulators of the Americas
<b>CPSS</b>	Committee on Payment and Settlement Systems
<b>CSD</b>	Central Securities Depository
<b>DvP</b>	Delivery versus Payment
<b>ESCB</b>	European System of Central Banks
<b>FDvP</b>	Final Delivery versus Payment
<b>FIBV</b>	International Federation of Stock Exchanges
<b>FRBNY</b>	Federal Reserve Bank of New York
<b>IAC</b>	International Advisory Council
<b>IADB</b>	Inter-American Development Bank
<b>ICSD</b>	International Central Securities Depository
<b>IOSCO</b>	International Organization of Securities Commissions
<b>ISIN</b>	International Securities Identification Number
<b>ISSA</b>	International Services Securities Association
<b>OECD</b>	Organization for Economic Cooperation and Development
<b>OTC</b>	Over the Counter
<b>RTGS</b>	Real Time Gross Settlement System
<b>SADC</b>	Southern African Development Community
<b>WB</b>	World Bank
<b>WHI</b>	Western Hemisphere Payments and Securities Clearance and Settlement Initiative



# SECURITIES CLEARANCE AND SETTLEMENT SYSTEMS

## A Guide to Best Practices

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## INTRODUCTION

This paper presents a methodology to assess securities clearance and settlement systems based on international standards and best practices. The first part of the paper discusses the major components of a typical system and identifies those issues that determine the extent to which the system satisfies the critical needs of all stakeholders for safety, soundness, certainty and efficiency at an acceptable level of cost. The issues identified during this discussion provide the foundation upon which the assessment methodology is constructed. Although clearance and settlement systems in all countries have a range of common features and functions, it is also clear that local realities stemming from historical developments as well as legal and cultural precedents can have a significant influence on the specifics of a particular national system. With this in mind, the assessment methodology described in this paper should be applied in a way that takes account of both international standards and local realities as it is evident that no specific common system can satisfy the total needs of all countries.

The primary policy, organizational, and operational facets of securities clearance and settlement systems can be identified through a structured analysis of the answers to four distinct but interconnected questions:

- What is the objective and scope of a securities clearance and settlement system;
- Who are the participants, what roles do they play, and what expectations do they have;
- What procedures are required to satisfy participant needs; and
- What inherent risks are involved and how can they be mitigated at an acceptable cost.

## OBJECTIVE, SCOPE, AND ELEMENTS<sup>1</sup>

A payment system can be defined as the collection of institutions, instruments, rules, procedures, standards, and technical means used to exchange financial value between two parties discharging an obligation.<sup>2</sup> A securities clearance and settlement system can be considered as part of the overall payment mechanisms of a country in that it satisfies the main features of this overall definition. In this case the exchange of financial value consists both of the exchange of securities (equity, fixed income, or derivatives) and the exchange of liquid funds (usually cash or sight deposits).

Regulation and oversight of payment services have traditionally been viewed as one of the three pillars of central banking. The other two are the conduct of monetary policy and active prudential supervision<sup>3</sup> of deposit taking institutions. In terms of securities, government securities have traditionally received close attention from the central banks due to the role that they play as the government's bank as well as the agent of the government in regard to public debt management. Many central banks have enlarged their role in the payments systems field beyond the regulatory and supervisory aspects and provide operational services that supplement or complement services provided by the private sector. The specific role filled

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<sup>1</sup> This section benefits from the presentation of Keppler, R.H., 1999, Transforming Payment Systems: The Building Blocks and the World Bank's Role, *World Bank/Federal Reserve Bank of New York (FRBNY) Seminar held at FRBNY, April 13-16, 1999.*

<sup>2</sup> Vid. Listfield, R. and F. Montes-Negret, Modernizing Payment Systems in Emerging Economies, August 1994, *Policy Research Working Paper #1936, The World Bank, Financial Sector Development Department.*

<sup>3</sup> Vid. Padoa-Schiopa, 1992, *La Moneta e il Sistema de Pagamenti.*

by central banks differ from country to country and can include the provision of special purpose large value, time-critical, funds transfer systems, bulk low value electronic systems, including automated clearing house services, and government securities clearance and settlement services.

The private sector, on the other hand, has traditionally provided most of the services for clearance and settlement of non-government securities. Moreover, in some countries, especially those in the early stages of capital markets development, comprehensive and rigorous attention to regulatory issues is sometimes lacking as initial major emphasis is placed, quite naturally, on matters relating to operational efficiency and cost. Today, securities clearance and settlement systems are recognized as having the same inherent risks as those associated with systemically important payment mechanisms. Both the efficiency and the safety<sup>4</sup> and soundness aspects of these systems are now receiving closer attention from domestic securities regulators as well as international organizations. In essence, the initial prominent role played by the private sector in the implementation and operation of securities systems is now being replaced by a combination of roles shared between the private and public sectors with specific and well defined roles being assigned to the securities regulator.

The key attributes of a securities clearance and settlement system can best be illustrated by examining each of the elements contained in the definition of a payments system presented above, i.e., institutions, instruments, rules, procedures, standards, and technical means.

**Institutions** provide the infrastructure to clear and settle securities transactions. Two types of institutions are involved and include "participants" that participate directly or indirectly in the clearance and settlement process (clearinghouses, settlement agents, service providers) or regulatory bodies that provide the regulatory framework to clear and settle securities in an orderly and safe way as well as providing overall oversight for the entire system.

**Instruments** are the vehicles used for transferring value. Two types of instruments are used. On the one hand, there are the securities which, in a broad sense, include equity, fixed income and derivatives.<sup>5</sup> On the other hand, there is the payments instrument which is used to transfer funds from the buyer of the securities to the seller. The specific instrument used to discharge the payment leg of the obligation varies and it is dependent on the participants to the transaction and the value of the associated payment. This relationship underscores the importance of an efficient and safe payments clearance and settlement system and its interconnectivity with the efficiency and safety of the securities clearance and settlement system. This interdependence will be discussed again in several sections of this paper.

**Rules** refer to the required legal and administrative framework including statutory, regulatory, and contractual rules that govern the rights and obligations of parties to a transaction. A fundamental ingredient of any efficient clearance and settlement system is a clear, comprehensible, sensible and enforceable (at low cost) legal regime. Technological innovation is having a major impact on the legal, regulatory and administrative arrangements; for example, on the need to ensure that the judicial system

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<sup>4</sup> *These concepts include: speed of settlement, certainty of settlement (correct amount, correct party, correct date, clear understanding when finality occurs), reliability (availability, in accordance with rules and regulations), safety and soundness (to ensure against fraud, credit and systemic risk, privacy), convenience (easy access, consistent with technological capabilities), cost (realistic, consistent with the service provided), universality (equitable basis by all financial institutions, interface with other systems).*

<sup>5</sup> *This paper is not focused on the specific details of derivatives clearance and settlement. For a detailed analysis of these issues vid. BIS, September 1998, OTC Derivatives: Settlement Procedures and Counterparty Risk Management, and March 1997, Clearing Arrangements for Exchange-Traded Derivatives.*

accept electronic records as evidentiary material and that digital signatures have the same attached rights and obligations as physical written signatures.

The securities clearance and settlement *procedures* vary significantly from one country to another. In some cases, the domestic procedures will differ depending on the specific nature of the securities that are being traded. Typically, procedures have evolved over time and reflect market practices, conditions, tradition and culture. Today, there is a clear trend towards the use of electronic clearance and settlement mechanisms. A cornerstone of such systems is the role played by central securities depositories (CSDs). Establishing a CSD results in increases both in efficiency and safety through the immobilization of securities and their safe storage in the CSD as contrasted with the old arrangements in which the “scrip” was actually held by the investor. Another benefit usually relates to the issue of securities in a dematerialized or book-entry form. Despite this common evolutionary path, there are still many variations in the way in which CSDs operate at the detailed level.

The most recent factor that has been introduced into the world of clearance and settlement concerns the role of standards. *Standards* are required to facilitate the efficient exchange of data between computer systems and also underpin the drive towards straight-through-processing in which the entire end-to-end or customer-to-customer transaction flow can be computerized. The use of a common set of standards is also essential in facilitating the integration of national systems into efficient and closely integrated international systems. Today, a wide variety of international institutions and organizations<sup>6</sup> are involved with the development of standards. In some cases, these standards have been established to realize specific purposes and relate primarily to a specific system or group of systems and thus may not be applicable to all systems. In addition, it should be noted that not every system, especially during the early evolution of securities markets in a country, can or must satisfy all of the standards that have been promulgated. From a practical perspective, the primary need is the availability of a set of standards and implementation guidelines that have applicability to securities markets at different stages of development in mature, transitional, and developing economies. To achieve this end, substantial work is now underway at the international level regarding standards development. It is worth noting that this work, quite appropriately, reflects the close interrelationship between securities transfer systems and funds transfer systems.<sup>7</sup>

Finally, the *technical means* provide the tools, and operational infrastructure for transmitting financial value between participants and intermediaries throughout the processing cycle. As mentioned above technological innovation is providing significant opportunities to reduce operational costs and improve the speed and the security with which information can be processed. However, technological innovation is also introducing new challenges, especially in regard to the need for appropriate legislative changes.

## PARTICIPANTS IN SECURITIES CLEARANCE AND SETTLEMENT SYSTEMS

A broad range of institutions and entities are involved in securities clearance and settlement systems. *Regulatory authorities* (mainly central banks, superintendencies of banks and securities regulators) create the legal and oversight environment within which the procedures are carried out. Sometimes they also provide clearance and settlement services, mainly in the case of government securities. *Participants* are those institutions that send/receive orders directly to/from the system or which are directly bound by

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<sup>6</sup> Box 4 present a list of some of the standards and best practices issued by international institutions and organizations.

<sup>7</sup> The CPSS (BIS) and IOSCO have initiated a joint effort to develop a comprehensive list of standards with applicability to all critical aspects of securities clearance and settlement systems.

the rules governing securities transfer systems. *Direct participants* directly exchange transfer orders with other participants in the system on behalf of themselves, their customers or on behalf of indirect participants. *Indirect participants* are distinguished from direct participants by their inability to perform certain activities such as input of transfer orders or acting as a settlement agent. The typical participants are described below along with a note of the functions that they perform and the services they provide. However, as will be noted, the roles of participants are not unique and do vary from country to country and from system to system. For example, some of the services/functions undertaken by a specific participant could be provided/performed by separate entities, or some of the services/functions provided/performed by several participants could be provided/performed by a single participant.

*Final investors* are the individual economic agents in an economy (households and firms) that invest surplus funds or savings with the objective of earning an attractive return on their investment. They normally trade in securities markets through an intermediary, broker/dealer or an institutional investor.

*Institutional investors* (mainly, banks, mutual funds, pension funds, and insurance companies) are playing an increasingly important role in securities markets. The high volume and value of transactions carried out by these institutions place them in a pivotal role in the clearing and settlement processes. International standards recognize the importance of their role and recommend that although they usually are not direct participants in the trading mechanisms, they should have direct participation in the confirmation/comparison/affirmation processes.

Both, final and institutional investors are *customers* of the securities clearance and settlement system. They are buyers, sellers or holders of securities and funds. However, they do not participate directly in the clearance and settlement arrangements.

*Issuers* are institutions that seek financing via the securities markets; thus, are obliged to pay interest or dividends and redeem the principal on securities issued by them. They are normally classified as public or private issuers. This distinction is important as countries often have different systems for processing trades in the public and private securities markets. In addition, the public securities market is normally regulated by the central bank whereas private securities markets are regulated by a separate securities regulatory authority. However, in some countries, where securities regulators do not exist, central banks typically assume the overall regulatory responsibility.

*Broker-Dealers* undertake the primary intermediation role in securities market trading. For this reason they also have a primary role in the clearance and settlement procedures. It is worth mentioning that the evolution and automation of the securities clearance and settlement systems is deeply affecting this segment of the industry. In particular, the design of the system, especially its impact on the liquidity needs that must be funded by these institutions, constitute sometimes a significant operational constraint. This can present particular difficulties for broker-dealers that focus on the retail sector.

*Custodians* are entities that undertake the safekeeping of securities and other financial instruments on behalf of others. They may provide other services such as clearance and settlement, securities lending, etc. A *Global Custodian* provides those services in respect of securities traded and settled not only in the country where the custodian is located but also in other countries throughout the world.

*Central Securities Depositories* (CSDs) provide facilities for holding securities in either immobilized or book-entry form. In addition to providing this safekeeping role, a CSD may provide trade comparison services, and clearing and settlement services.

*International Central Securities Depositories* (ICSDs) are institutions that settle trades in international securities and in various domestic securities. They usually settle the trades in their own books or through

direct or indirect links (through local agents) to domestic CSDs.

**Exchanges** and **Over the Counter (OTC) markets** are the mechanisms for trading activity carried out by broker-dealers. Prices are determined by auction bidding on the floor of an exchange or by negotiation (through telephone communications, computer-controlled networks of quotation terminals, etc.) between buying and selling broker-dealers in the case of OTC markets. The key factor from a clearing and settlement perspective is the way in which trading information is transmitted rather than on the way in which trading takes place.

The **clearing agent** is the entity that carries out the procedures of trade capture, matching, confirmation and calculation of obligations relating to securities transfer instructions prior to settlement. These functions are normally provided by CSDs together with the depository function or by the exchange where the trading takes place. Sometimes the clearing agent assumes counterparty risk by netting the aggregate positions of the participants in a process referred to as "*novation*". In this case, the clearing agent also performs the settlement function.

A **settlement agent** manages the settlement process, determines the settlement positions and monitors the exchange of securities and payments. Again, this function is sometimes provided by CSDs or exchanges. The payment of funds is usually done through a **settlement bank** (private bank or central bank), although in some situations is directly done by the broker/dealer or its paying agent through a means of payment such as a check or a certified check.

A **correspondent bank** provides payments and other services to another bank. Such services are primarily provided across international boundaries. It is included in this list because of its relevance to cross-border securities transactions and especially in regard to the role it plays in the payments leg of the transaction.

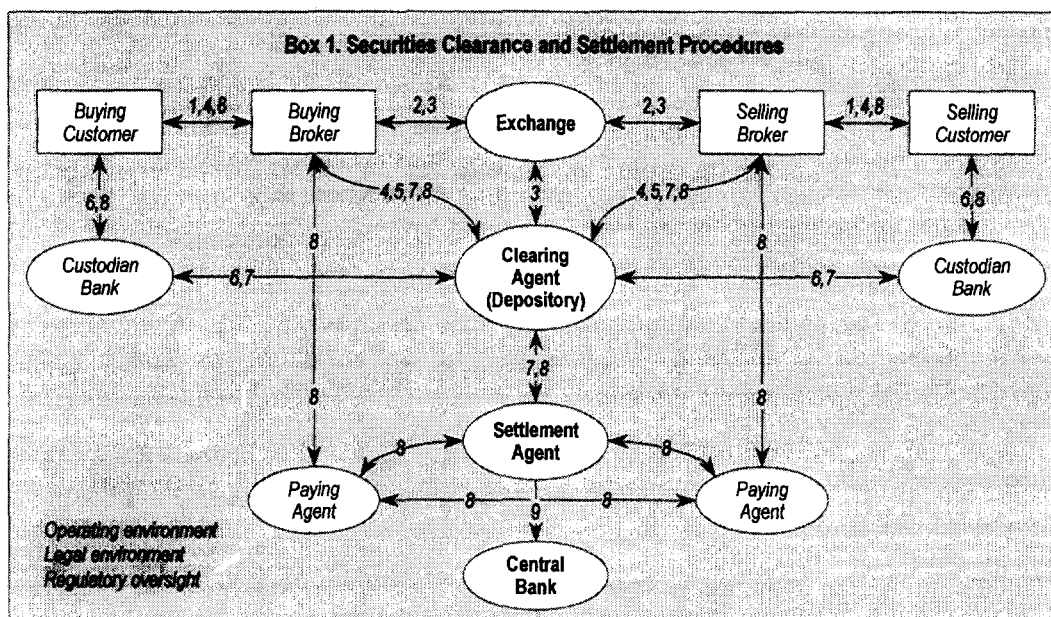
## SECURITIES CLEARANCE AND SETTLEMENT PROCEDURES

After a trade is executed in an exchange or an OTC market there are still a number of stages to be followed in order to achieve an effective transfer of value (securities vs. payment) between the counterparties. These procedures can be quite different from one country to another and even in the way that different securities are traded within a country. This section describes the key aspects of this process. An exhaustive treatment of the many variations and local conditions embedded in such systems around the world is not attempted. The primary purpose is to illustrate the key issues that authorities should consider when striving to achieve an appropriate balance between safety and efficiency. To cover the full range of unique characteristics encountered in specific countries is beyond the scope of this paper. This task is being performed by international organizations that have published or are in the process of publishing reports describing the specific operational and regulatory mechanisms embedded in specific national systems.<sup>8</sup>

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<sup>8</sup> The Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries periodically publishes - under the aegis of the Bank for International Settlements ([www.bis.org](http://www.bis.org))-reference works on payment systems in various countries, the so-called Red Books. Volumes that are similar to the Red Book format have also been issued by the European Monetary Institute (for the European Union countries) and by the Executives' Meeting of East Asia and Pacific Central Banks and Monetary Authorities (for the EMEAP member countries). "The Green Book", covering the countries of the Southern African Development Community (SADC) has been produced by the SADC Payment System Project Team under the auspices of the SADC Committee of Central Bank Governors. The WHI

Box 1 presents the typical procedures that are undertaken in a securities clearance and settlement system. The lifecycle of a securities transaction involves three phases: trade execution, trade clearance, and trade settlement.<sup>9</sup> These procedures should be designed and developed to work within a specific legal and operating environment and thus take account of local regulatory and oversight arrangements. An understanding of these latter factors is essential as they influence the way in which the procedures are used and thus contribute to any inherent risks embedded in the system. The nature of the operational environment is assuming increasing importance in most countries as technological innovation is changing the way that information is processed and managed and thus has an impact on all other factors. The way the authorities adapt to the new operational conditions is critical to maintaining efficient and safe systems. It is thus clear, that both the legal and regulatory oversight arrangements need to evolve in line with technology driven changes in operational procedures.



#### TRADE EXECUTION:

1. Buying and selling customers place their orders with their respective brokers.
2. Brokers execute client's orders at the Exchange.
3. The Exchange sends to the Clearing Agent and brokers the detail of transactions executed.

*The trade execution could be done directly between the counterparties. Transactions between brokers/dealers are normally carried over an exchange or OTC market. The procedures could be paper-based or through electronic processing and communications systems. It is common that depositories perform as well the function of clearing agents. Usually, trading details are sent from the Exchange to the Clearing Agent on T.*

([www.ipho-whpi.org](http://www.ipho-whpi.org)) coordinated by the World Bank and CEMLA, with participation of a broad range of institutions through its International Advisory Council (IAC) is elaborating similar reports, "Yellow Books", covering both payments and securities clearance and settlement for Latin American and Caribbean Region.

<sup>9</sup> Vid. Stehm, J., April 1996, Clearance and Settlement Systems for Securities: Critical Design Choices in Emerging Market Economies, *World Bank Discussion Papers*, No. 321.



## TRADE CLEARANCE:

### Trade Capture/Matching/Confirmation/Comparison and Affirmation

4. Brokers, both buying and selling, send to the Clearing Agent trade details. Brokers deliver a confirmation to their customers containing the details of the customer's executed orders.
5. The Clearing Agent compares each side of the trade and provides a report to each broker.
6. For large institutional investors, the confirmation is normally directed to an intermediary such as a custodian acting as agent for the investor in the clearing process.

*During this phase the information flow continues until there are no mistakes in trade details. In some cases those processes may occur outside of the clearing agent as part of the trade execution process. When the trades are transmitted as "locked-in" transactions by the computer systems of the exchanges or OTC markets, the details of the trades have already been matched. Ideally, all comparison of trades between market participants should be accomplished by T+1.*

### Calculation of settlement obligations

7. The Clearing Agent sends to the brokers, custodians and settlement agent the securities balances (gross, bilateral net or multilateral net) and the fund balances (gross, bilateral net or multilateral net). In case of mistakes, the information flow continues until the balances are correct.

The selling broker must provide availability of securities before the settlement time, and the buying broker must provide availability of funds before the settlement time.

#### Availability of securities

- Securities in book-entry form: *Immobilized and dematerialized securities are available through the broker's accounts in the depository. Normally, the value of securities traded are blocked until the trade is settled, and cannot be used for other trades in subsequent days.*
- Securities in physical form: *The broker should make them available in the settlement day.*

#### Availability of funds

- Payment through a settlement agent: *In this case brokers or its paying agents have an account at the settlement agent (usually a bank) and the clearing agent communicates the balances to the settlement agent before settlement day. Broker's paying agents (usually banks) or custodians send the funds before settlement time.*
- Direct Payment by the Broker: *In this case buying brokers directly provide the funds at settlement time by a means of payment (e.g., a check, certified check) or instruct a direct payment through its paying agent to the selling broker.*

*In some occasions the clearing agent guarantees the trade netting the delivery and receipt of settlement obligations. This is referred to as "novation" or the substitution of one party for another (the clearing agent becomes the buyer to every seller and the seller to every buyer). In most markets trade clearance typically ranges from T+1 to T+5.*

## TRADE SETTLEMENT

8. Securities are delivered in exchange of funds.

#### Delivery of securities

- Through a Depository (securities are previously immobilized in the depository or issued in a dematerialized form)
- Directly between the brokers (physical form of securities)

**Payment**

- Through a Settlement Agent
- Directly between the brokers by a means of payment (e.g., check, certified check)

9. The funds are finally registered in the Central Bank accounts. These funds will be final unless intercepted by judicial resolution.

*Securities are transferred through the clearing agent with physical delivery or through a book-entry system. In the last case, if the depository is a different institution, the clearing agent instructs the depository and the movement of the securities takes place through the depository accounts. Funds settlement could be done directly by the brokers/dealers by a means of payment or through its payment agent, or centralized in a settlement agent that receives and pay the funds directly through the brokers or its paying agents that pay or receive the money on the participant's behalf. Sometimes, mainly in the case of public securities, for both securities and funds, the settlement is done through the Central Bank accounts. Ideally, securities should be delivered if, and only if, there is payment and vice versa, i.e., on a DvP basis.*

The process begins with the *trade execution* phase. The two parties agree to exchange a certain amount of securities for a certain amount of funds on a particular settlement date. The transaction details could be agreed directly between the two counterparties. Transactions between broker/dealers are normally carried out in an exchange or OTC market.<sup>10</sup> Box 1 illustrates the case of a transaction processed through an exchange in steps 1, 2 and 3. For clearance and settlement purposes the fact that a trade is executed in an exchange or OTC market is not significant.

*Trade clearance*<sup>11</sup> refers to the procedures necessary to determine the obligations of direct market participants (broker/dealers, etc.) to deliver securities and funds following trade execution. It includes trade capture, matching, confirmation, comparison and affirmation procedures (steps 4 to 6 in box 1) and the calculation of settlement obligations (step 7 in box 1). Once a trade is executed, the next step is to record (capture) the key information relating to the trade and to assure that the counterparties agree upon all of the terms of the transaction and are able to review and confirm these trade details (matching and confirmation). If the exchange or OTC market transmits "locked-in" trades, trade matching is done jointly with trade execution and all these procedures occur simultaneously with the delivery of the information by the exchange. If foreign investors participate in the trading; custodian banks normally act as agents for these investors in the clearance and settlement process. In some cases, indirect market participants (institutional investors and custodians), due to the high volume of their operations, participate in a trade comparison system with positive affirmation of trade details.

The calculation of settlement obligations can be done on a gross,<sup>12</sup> bilateral net,<sup>13</sup> or multilateral net<sup>14</sup>

<sup>10</sup> It is difficult to have disclosure of off-market transactions, those dealt outside the rules and mechanisms of recognized stock exchanges or other recognized self-regulation markets and bodies. This creates a difficulty in the performance of securities clearance and settlement systems due to the inability to monitor minimum capital requirements, adequacy standards on the behavior in line with the code of conduct, etc.

<sup>11</sup> This phase is sometimes referred to as Trade Processing.

<sup>12</sup> The settlement occurs individually on an order-by-order basis.

<sup>13</sup> The debits and credits between any two participants are set off.

<sup>14</sup> Each participant's total debit and credits to the entire system are offset, leaving the participant with a single net position in relation to the entire system.



basis for both the securities balances and the funds balances. The choice is not irrelevant. On the contrary, it impacts very importantly the efficiency and risk exposure of the system. In addition, this choice is influenced by market characteristics, especially those relating to the availability of liquidity. As it will be made clear later in this section, the principle strengths and weaknesses of the two methods require careful study and always result in tradeoffs between liquidity requirements and risk mitigation, especially those risks relating to settlement failure. Gross settlement systems eliminate risk, but require more liquidity than net settlement systems. However, net settlement systems have increased risk due to the deferred nature of the settlement process.

**Box 2. Trade confirmation/comparison/affirmation**

<i>Trade comparison type</i>	<i>Description</i>
Locked-in	The Exchange or OTC market deliver trades of its participants on a locked-in basis, that is, the trades are already matched.
Matched	The information on securities traded by its participants is submitted to the clearing agent by the exchange or OTC market, which compares and matches the buy and sell sides of the trades. Comparison members submit the trade data and the clearing agent send confirmation reports to comparison members that validate the comparison of the trade data.

Finally, settlement involves the discharge of settlement obligations through the final transfer of securities from the seller to the buyer, and the final transfer of funds from the buyer to the seller. Again, this could be done by a variety of procedures but two elements represented by the concept of *Final Delivery versus Payment* (FDvP)<sup>15</sup> are critical. This means that securities should be delivered if, and only if, there is payment and vice versa, i.e., on a *Delivery versus Payment* (DvP) basis. But as important as the previous concept is that transactions are final, i.e., that the securities and funds legs cannot be reversed, it should also be noted that finality is affected by the particularities of legal and judicial systems. Thus, legal issues such as the concept of nominee or the provisions embedded in bankruptcy laws should be seriously considered by the authorities to ensure consistency with securities laws, regulations and operational procedures.

Clearly, securities clearance and settlement systems are characterized by many features and functions. Experience indicates that three features are especially significant when designing a country assessment methodology as they represent core system design issues with varying solutions each having associated strengths and weaknesses. They are: (a) the instruments themselves which can be either paper-based or held solely as computer records, (b) the role of CSDs, and (c) the use of gross versus net settlement schemes.

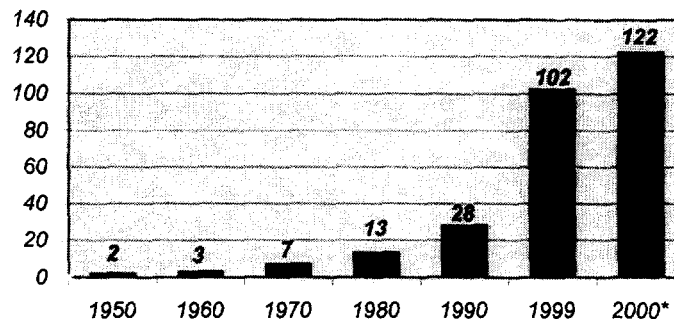
Systems typically evolve from an initial use of paper-based instruments with physical delivery of certificates between counterparties to computer-based transfer mechanisms in which records of ownership are held in so-called book-entry form. Evolution usually takes place in two steps. The initial step comprises immobilization in which the paper instruments are stored in a secure location or locations rather than being held by the individual investors. The second step is concerned with dematerialization in which paper instruments are replaced by computer records. Clearly the pace of evolution is heavily dependent on the availability of appropriate technology, and the size of the market in terms of both volume of securities issued and traded and the number of active investors. Technological innovation has

<sup>15</sup> This concept is referred sometimes as true DvP or real DvP.

reduced equipment and telecommunications costs and has facilitated the trend to move away from the physical delivery of instruments. This is not only a more efficient mechanism but also a safer one as it eliminates the movement of paper and thus reduces associated risks such as those relating to lost, stolen, or altered documents. In an immobilized system, physical certificates are held in secure vaults and provide the essential support for book-entry maintained ownership positions of market participants. In a dematerialized system, physical securities do not exist as they are replaced by book-entry records. In such systems the individual investor has an interest right in a pool of fungible securities.

Key issues to be addressed when contemplating the elimination of physical delivery relate to the legal framework and the attitudes of investors. A legal framework which is appropriate for paper-based systems does not readily accommodate immobilization or dematerialization. Normally, amendments to laws are required, and depending on the legal system of the country, this can take a long time and should be taken into account. In many situations, individual investors have more confidence in a system which allows them to hold physical securities despite the associated risks. In moving to book-entry based systems, it is frequently necessary to wean investors away from this practice by providing an initial option to hold securities in either format as well as the option to change from one format to the other. A market strategy based on incentive pricing coupled with the dematerialization of all new issues can then be used to progressively move toward full dematerialization.

**Figure 1. Number of CSD Organizations**



\* Includes 20 operational and/or planned CSDs.

Source: Thomas Murray, "Evaluating Local Market Custody Arrangements"

A second important improvement initiative, closely related to that described above, is the establishment of central securities depositories/registries (CSDs) (see Figure 1). These institutions are created to facilitate the smooth and efficient operation of book-entry systems. CSDs provide key services including securities ownership recordkeeping and custody of physical certificates in immobilization regimes. However, in some systems there are still requirements for post-settlement processing such as the updating of share registers and the issue of replacement certificates. CSDs usually perform the clearing agent function and sometimes they also provide dividend and interest payments services. These institutions are normally private firms with a non-profit objective and are constituted as Self Regulatory Organizations (SROs) under the oversight of the securities market regulator. The use of the word "central" can be misleading, as there can be several depositories in a country rather than only one. The number of depositories depend on the complexity and size of the market. Nevertheless, today there is a trend towards centralizing all the securities clearance and settlement activity of a country in one single CSD with possibly a number of linked sub-depositories.

A gross settlement system requires a critical mass of marketable securities and system-wide liquidity for its efficient operation. Systemic risk in gross settlement systems is low as transactions are not executed unless there are securities and funds in the accounts of the counterparties. The relatively recent and

rapidly growing use of *real time gross settlement systems*<sup>16</sup> reduces credit and liquidity risk in comparison with *batch processing systems*.<sup>17</sup> However, the associated liquidity needs may represent a significant constraint to the adoption of these systems in securities markets, as participants are mainly broker/dealers that typically lack the amount of liquidity required for the smooth operation of such systems, unless they are owned by or have a close relationship to a commercial bank. For this reason, the choice of settlement mechanism is not straightforward. It could affect the evolution of the market in terms of the dominant institutions (banks vs. non bank dependent broker/dealers) and the pattern of the market towards a retail or wholesale dominance.<sup>18</sup> As a consequence, gross settlement systems are more frequently used to remove the risks embedded in large-value funds transfers systems in which the main participants are banks that have access to intraday liquidity provided by the central bank within carefully controlled arrangements. Well designed gross settlement systems typically include queue management procedures and other mechanisms such as bilateral and multilateral offset arrangements to mitigate against the impact of so called *gridlock*<sup>19</sup> in the system.

Net systems, because of the deferred nature of settlement, avoid the need for large amounts of intraday liquidity, however the specific volume and value of transactions flows should be studied to determine the potential for risk. By reducing the overall value of the final funds transfers that have to be made between participating financial institutions, netting can enhance the efficiency of national payments systems. But netting can also contribute to an increase in systemic risk. This may be the case if, instead of achieving reductions in participants' true exposures, it merely obscures the level of these exposures. The true position becomes apparent only when the net positions are identified at the end of the clearing cycle. At this point, shortages of either securities or funds are identified. Should appropriate cover not be available, then in the simple case, transactions have to be unwound with the obvious negative impact on system participants and market confidence. Well designed netting systems can mitigate against these implications by invoking previously agreed settlement assurance procedures. Such procedures can be quite costly and are sometimes quite difficult to put in place. In some system arrangements, the clearing agent guarantees settlement and in effect becomes the counterparty to each trade. This mechanism is referred to as *novation* and requires that a supporting legal environment is in place.

Operational systems, especially those in transition, often exhibit a combination of gross and net schemes. For example, it is not uncommon to see systems that combine securities gross settlement with funds net settlement. The BIS made an effort to categorize the range of existing systems<sup>20</sup> using different flavors of the concept of DvP, already mentioned. It should also be noted that the boundaries between real time gross settlement systems and net settlement systems are becoming blurred. An increasing number of net settlement systems now settle periodically during the day rather than solely at the end of the day. This reduces the potential for settlement failure by reducing the progressive build-up of credit exposures between participants. Also, as noted earlier, gridlock busting routines in gross settlement arrangements make use of embedded net settlement off-set concepts. This trend is continuing and it is likely that some form of final convergence between these mechanisms will take place.

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<sup>16</sup> A gross settlement system in which processing and settlement take place in real time (continuously).

<sup>17</sup> Processing of a group of securities transfer instructions and/or payment orders at a set of discrete intervals of time.

<sup>18</sup> The debate about this issue is broader and covers other areas such as equal regulatory treatment.

<sup>19</sup> Situation in which the failure of some transfer instructions to be executed prevents a substantial number of instructions from other participants from being executed.

<sup>20</sup> BIS (CPSS), September 1992, Delivery versus payment in securities settlement systems.

In order to clarify and quantify the points previously developed, let's assume a market with  $k$  broker/dealers and only one traded security. Matrix  $T$  represents the transactions carried over by broker/dealers in this market. An item in the matrix,  $t_{ij}$ , represents the value of securities bought by broker/dealer  $i$  from broker/dealer  $j$ .<sup>21</sup> In a gross settlement system, matrix  $T$  represents the number and value of transactions as well as the number and value of settlement operations. If transactions are settled on a bilateral basis, the number and net value of settlement operations are represented by Matrix  $N$ . In this case,  $n_{ij}$ , represents the net position of broker/dealer  $i$  against broker/dealer  $j$ . If the net system uses a multilateral basis, the number and value of settlement operations is represented by matrix  $M$ , in which each element of the matrix,  $m_i$ , represents the multilateral net position of each broker/dealer.

$$\begin{array}{ccc}
 \text{Matrix } T & \text{Matrix } N & \text{Matrix } M \\
 \begin{bmatrix} 0 & t_{12} & t_{13} & \dots & t_{1k} \\ t_{21} & 0 & t_{23} & \dots & t_{2k} \\ t_{31} & t_{32} & 0 & \dots & t_{3k} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ t_{k1} & t_{k2} & t_{k3} & \dots & 0 \end{bmatrix} & \begin{bmatrix} 0 & n_{12} & n_{13} & \dots & n_{1k} \\ 0 & 0 & n_{23} & \dots & n_{2k} \\ 0 & 0 & 0 & \dots & n_{3k} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & \dots & 0 \end{bmatrix} & \begin{bmatrix} m_1 \\ m_2 \\ m_3 \\ \vdots \\ m_k \end{bmatrix} \\
 \\
 n_{ij} = |t_{ij} - t_{ji}| & & m_{ij} = \sum_{j=1}^k t_{ij} - \sum_{i=1}^k t_{ij}
 \end{array}$$

Table 1 shows the type of settlement in combination with the number and value of settlement operations. In a gross settlement system the number and value of settled operations is higher than in net systems,<sup>22</sup> i.e., the liquidity needs of the system is potentially higher. The analysis could be made more exhaustive by assuming a combination of different types of settlement for the securities leg and the payments leg, but it would complicate the exposition without affecting the conclusions. However, as mentioned earlier, it is not uncommon to see systems that combine securities gross settlement with funds net settlement or other type of combinations.

**Table 1. Number of Settlement Operations and Liquidity Needs by Settlement Type**

Settlement Type	Number of Settlement Operations	Value of Settlement Operations
Gross	$k(k-1)$	$\sum_{i=1}^k \sum_{j=1}^k t_{ij}$
Bilateral Net	$k(k-1)/2$	$\sum_{i=1}^k \sum_{j=1}^k n_{ij}$
Multilateral Net	$k$	$\sum_{i=1}^k m_i$

<sup>21</sup> For simplicity purposes, it is assumed that each item in the matrix,  $t_{ij}$ , represents a single operation, thus, matrix  $T$  provides the information about the number of operations (one per item) and the value. It is assumed, also for simplicity purposes, that there are no transactions within a broker.

<sup>22</sup> Note that in this case, the number and value of transactions is the same as the number and value of settlement operations, unlike the case of net systems.

In order to analyze what happens if there is a fail in the system, let's suppose that broker/dealer 1 is unable to deliver funds on settlement date for the transaction executed with broker/dealer 2. That is, transaction  $t_{12}$  cannot be executed. Table 2 shows the number and value of transactions affected. In this case, a gross settlement system would be less affected both in terms of number and value of transactions. The multilateral net system will be the most affected due to the need for recalculation of multilateral net positions.

**Table 2. Number and Value of Transactions Affected by a Settlement Fail**

<i>Settlement Type</i>	<i>Number of Transactions Affected</i>	<i>Value of Transactions Affected</i>
<i>Gross</i>	1	$t_{ij}$
<i>Bilateral Net</i>	2	$t_{ij} + t_{ji}$
<i>Multilateral Net</i>	$2k-3$	$\sum_{j=1}^k t_{1j} + \sum_{i=1}^k t_{i2}$

**Box 3. Example of Gross versus Net Settlement Systems**

Let's assume 4 broker dealers operating in a market with a single security. Matrix A represents the transactions in the market. The rows show the value of purchases by brokers/dealers while the columns represent the value of sales by brokers/dealers. The result of tables 1 and 2 of the text are presented below for this specific example clarifying the conclusions already presented in the text.

**Matrix A**

0	10	15	20
20	0	30	15
35	20	0	10
5	15	40	0

**Number of Settlement Operations and Liquidity Needs by Settlement Type**

<i>Settlement type</i>	<i>Number of settlement operations</i>	<i>Value of settlement operations</i>
Gross	12	215
Bilateral net	6	85
Multilateral net	4	60

**Number and Value of Transactions Affected by a Settlement Fail**

<i>Settlement type</i>	<i>Number of transactions affected</i>	<i>Value of transactions affected</i>
Gross	1	10
Bilateral net	2	30
Multilateral net	5	90

## EXPOSURE TO RISK WITHIN THE SYSTEM

Clearing and settlement procedures expose participants to a number of risks. Maintaining acceptable levels of safety and soundness is a primary regulatory objective. More recently the regulatory role has been expanded to include system efficiency as an equally important objective. Risks<sup>23</sup> stem from weaknesses in system design and can have their origin in any of the following: (a) rules and procedures, (b) institutional arrangements, (c) participants, (d) technical mechanisms, and (e) the need for implicit and/or explicit extension of credit. The specific major risks are discussed in the following paragraphs.

**Credit risk** is the risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter. It involves both the **replacement cost risk** and **principal risk**. Replacement cost risk is the loss of unrealized gains on unsettled contracts due to changes in securities market prices between the time a trade is executed and the time that it is settled. The exposure depends on the market price volatility and the time gap between trade date and settlement date. Principal risk is the risk that the full value of securities or funds will be lost by either the seller or buyer, when the respective counterparty fails to settle. This risk can be eliminated by introducing an acceptable form of DvP.<sup>24</sup> **Third party credit risk** arises when settlement participants are permitted or required to use banks or intermediaries to guarantee or provide settlement funds and fail to perform, whether or not the settlement participant has performed its obligations.

**Liquidity risk** is defined as the risk that a counterparty will not settle an obligation for full value when due, but on some unspecific date thereafter. If a counterparty fails to settle, it does not always mean that it is insolvent. The reason could be a failure in the technology being used (a computer failure), a transitory liquidity problem or a “cascading” effect from other failed transactions. However, it is very difficult to determine ex-ante if the counterparty is having a liquidity or solvency problem. Moreover, in some situations, an unresolved liquidity problem could result in subsequent insolvency. In any case, the implication for the non-defaulting counterparty might well be the need to liquidate assets, borrow funds or borrow securities.

**Operational risk** stems from breakdowns in internal controls, failure to follow procedures or inability to follow procedures. Operational weaknesses or failures can result in specific problems such as credit or liquidity problems and indeed can create the potential for fraud. Sufficient attention should be given to the need for appropriate logical and physical security arrangements, especially those relating to data integrity including the use of rigorous encryption and message authentication/non-repudiation procedures as well as strong system access controls.

**Legal risk** stems from ambiguity or uncertainty in the rules governing the clearance and settlement process. In an environment with widespread legal uncertainty, participants may view the systems as being unreliable, and unfair. Legal risks can also impede the ability of payment system operators to manage credit and liquidity risks (unenforceability of netting arrangements, bankruptcy laws may force payments to be revoked, no validity of interests in pledged collateral). In general, legal risks can arise from three different sources. First, rules may not clearly allocate responsibilities (liabilities or losses)

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<sup>23</sup> See Payne, Myriam, May 1999, Risks in Payments Systems, presented in the Thomas Murray Global Custody Conference on Minimizing Risk in Clearing, Payment and Settlement Systems held at New York May 24-25 1999.

<sup>24</sup> Note that this risk is non-existent when there is simultaneity in the transfer of securities and funds. However, it could be that even in the absence of this simultaneity, DvP is accomplished, provided that there is delivery if, and only if, there is payment and vice versa.

among the parties to a payment. Second, rules may fail to address payment authenticity and security (i.e., gaps in the legislation). Finally, they may provide a favored position to either payment service providers or users. Ambiguous or conflicting statutes, poorly written regulations and ill-conceived private contracts governing securities transactions can also exacerbate these problems. A particular weakness can arise in situations when there may very well be appropriate laws in place but the willingness to enforce the laws is weak or non-existent.

**Custody risk** is the risk of loss of securities held in custody occasioned by the insolvency, negligence or fraudulent action of the custodian or a sub-custodian. If the security is maintained directly by its owner by means of a physical certificate this risk stems from the possibility of stolen or lost securities (*own custody risk*). Custody risk can also be influenced by weaknesses connected with operational and legal risks.

**Cross-border settlement risk**<sup>25</sup> is the risk that one party to a cross-border transaction<sup>26</sup> will deliver the security it sold but not receive the related funds or pay for the security it bought but not receive delivery of the security. In cross-border transactions the enforcement risk is of critical importance and care must be taken to ensure enforceability in all relevant jurisdictions.

Finally, from a risk perspective, a situation can arise in which a problem created by one counterparty can affect the capacity of others to settle and thus trigger a domino effect. **Systemic risk** is defined as the risk that the inability of one participant to meet its required obligations will cause other participants to be unable to meet their obligations when due.<sup>27</sup>

Management initiatives, procedures, and tools have been developed to mitigate the impact of the risks described above. Table 3 presents a range of risk management tools and the associated targeted risk:

**Table 3. Risk Management Tools for Securities Clearance and Settlement Systems**

Risk	Risk Management Tools
<b>Credit Risk</b>	<b>Admission Standards:</b> Clearing agents often maintain membership requirements to ensure financial stability of its participants assuring that every member is creditworthy upon admission. They normally include requirements such as minimum capital levels, liquidity requirements, operational capabilities and, in some cases, approval from the appropriate regulatory bodies. It is very difficult to evaluate a participant's overall financial health when it is involved in activities across multiple markets. In addition, there is an important trade-off between a safe system and a broad and fair participation in the market.

<sup>25</sup> In the context of foreign exchange risk it is sometimes referred as *Herstatt risk*.

<sup>26</sup> A transaction between counterparties located in different countries.

<sup>27</sup> In this regard, the BIS (CPSS) has recently introduced the concept of systemically important payments systems, that is, systems which could trigger or transmit systemic disruptions in the financial area because of the size or nature of individual payments which they handle or because of the aggregate value of the payments processed. Vid. BIS (CPSS), December 1999, Core Principles for Systemically Important Payment Systems.

Risk	Risk Management Tools
<b>Credit Risk</b>	<b>Monitoring members' creditworthiness:</b> In addition to admission standards participants have to submit copies of their financial statements and are subject to periodic reviews.
	<b>Novation:</b> Satisfaction and discharge of existing contractual obligations by means of their replacement by new obligations. In the context of the securities clearance and settlement system the clearing agent sometimes guarantees the delivery and receipt of settlement obligations, becoming the counterparty to each trade. However, novation moves the credit risk to the clearing agent obliging this institution to implement risk management tools to face this exposure.
	<b>Clearing Fund:</b> Contributions from participants to cover losses which might take place during business operation.
	<b>Buy ins and Sell outs:</b> These are settlement assurance procedures that, in case of a settlement failure, allow the buy of securities in the market at the seller (who failed) cost (buys-in) or the sale of securities in the market at the buyer (who failed) cost (sell-outs).
	<b>Net debit caps:</b> A net debit cap is the maximum amount that a participant is permitted to incur in its net debit position to all other participants. It establishes an upper limit to the exposure that any participant can pose to the system. It is normally linked to the liquid resources available for the clearing agent. In order to be effective, transactions that exceed a participant's net debit cap should be rejected.
	<b>Bilateral credit limits:</b> Sometimes clearing agents require each participant to establish a bilateral credit limit with each of the other participants
	<b>Collateral:</b> Clearing organizations require collateral to cover certain exposures. The type of collateral accepted ranges from liquid assets such as cash or government securities to the securities cleared by the arrangement. The concentration of collateral, the legal perfection of the security interests and adequate valuation are issues that have to be carefully considered in order to determine the effectiveness of the collateral. Bankruptcy laws may affect the clearing organization's and its participants collateral interests due to different priorities among creditors and the so called "zero hour" rule or simply different institutions may have different bankruptcy procedures.  In the futures/commodity markets margins act sometimes as collateral. Margin is a good faith deposit (of money, securities or other financial instruments) assuring that a future contract will be fulfilled. <sup>28</sup>

<sup>28</sup> In the equity markets, margin has another meaning. It is the money deposited with the broker that serves as partial payment when purchasing securities. The money deposited with the broker is the difference between the purchase value of the shares and the collateral value (haircut).





## A METHODOLOGY TO ASSESS COUNTRY SYSTEMS BASED ON INTERNATIONAL STANDARDS

A number of international standards and best practices have been produced and are useful in assessing the quality of a securities clearance and settlement system. Annex 2 contains references to the major sources of standards. These were used as the starting point in developing the assessment methodology that is being used as an integral component of the WHI. The methodology is being used as a tool for undertaking structured assessments of securities clearance and settlement systems in countries visited during the Initiative and has provided a sound basis for identifying improvement opportunities. A summary of the methodology, expressed in matrix format, is included in Annex 1 of this paper.<sup>29</sup>

### **Box 4. The Western Hemisphere Payments and Securities Clearance and Settlement Initiative (WHI) ([www.ipho-whpi.org](http://www.ipho-whpi.org))**

Following a request from the Western Hemisphere Finance Ministers, the World Bank launched in January 1999 the WHI. The World Bank, in partnership with the Centro de Estudios Monetarios Latinoamericanos (CEMLA), leads this initiative. Its objective is to describe and assess the payments systems of the Western Hemisphere with a view to identifying possible improvement measures in their safety, efficiency and integrity. To carry out this mandate, an International Advisory Council (IAC) was established in March 1999 comprised of experts in the field from several institutions. In addition to representatives from the WB and CEMLA this Council includes members from the Bank for International Settlements, Bank of Italy, Bank of Portugal, Bank of Spain, Council of Securities Regulators of the Americas (COSRA), European Central Bank, Federal Reserve Board, Federal Reserve Bank of New York, Inter-American Development Bank, International Monetary Fund, International Organization of Securities Regulators (IOSCO), Securities Commission of Spain and U.S. Securities Commission (SEC).

The initiative has undertaken a number of activities in order to respond to the Western Hemisphere Finance Ministers' request. These include: the preparation of public reports containing a systematic in-depth description of each country's payments clearance and settlement systems; the delivery of recommendations reports to country authorities on a confidential basis; the organization of IAC meetings to review country studies and provide input for future work; the organization of workshops focusing on issues of particular interest; the creation of a web-page to present the outputs of the Initiative and other information of interest in the payments systems area; and the promotion of working groups to ensure continuity to the project.

A review of existing standards suggested that they had been designed to address specific problem situations and in certain cases may not be immediately relevant to the conditions found in emerging markets. For this reason, the methodology used during the WHI does not focus on the application of individual standards. Rather, it takes a broader view based on an assessment of the way in which the

<sup>29</sup> The first version of the matrix was prepared in the context of the Initiative by the securities team that visited Chile in December 1999 and included: De La Lastra, Iñigo (Comisión Nacional del Mercado de Valores, CNMV Spain); Guadamillas, Mario (World Bank) and Holttinen, Eija (Financial Supervision Authority, FSA Finland). The document was modified by the securities team that visited Trinidad and Tobago in February 2000 and included: Guadamillas, Mario (World Bank); Salas, Andrea (Comisión Nacional de Valores, CNV Argentina) and Saverson, Ester (US Securities Exchange Commission, US SEC). The matrix has benefited from comments of the rest of the international teams that visited the countries, local authorities, the core team of the project and IAC members.

main issues discussed earlier in this paper are addressed in the individual systems being assessed. The assessment methodology focuses on seven significant issues: clearing and settlement process, settlement risks, legal issues, regulatory oversight issues, clearing and settlement institutions and their participants, safeguarding issues and system capacity. They are discussed separately, for analytic purposes, although it is clearly recognized that strong inter-relationships exist between each issue. In addition, three specific sections are included to deal with the particularities of government securities clearance and settlement, cooperation with the payments systems<sup>30</sup> and international linkages. A primary objective is stated in each case along with a note of the characteristics that are believed to best influence the realization of the objective.

### ***1. Clearing and Settlement Process***

***Objective:*** *To have prompt and reliable systems for processing trades, that are cost-effective and convenient to use.*

The clearance and settlement process includes capturing trade information, trade matching, confirming and affirming institutional investor's trades, clearing, and settlement. Various international organizations have attempted to set standards for the prompt, efficient and effective trade processing, including its cost-effectiveness (both, in terms of system operation and fees paid by participants), and ease and convenience of use. Traditionally, many systems have been designed with settlement occurring on T+5. One of the most widely recognized concepts is that the longer it takes to settle a securities trade the greater is the risk that settlement may not take place. In this regard, the G30 recommended that trade settlement should occur by T+3 or less. Clearly the shortest possible elapsed time between trade date and settlement date is a desirable goal in system design. However, the practical impact of shortening this time must be assessed, especially if it has an impact on the number of trades that fail to settle.<sup>31</sup> Same day settlement could be considered as the final goal, although it is generally recognized that this may not be achievable in the short/medium term, particularly for cross-border transactions. The magnitude of the changes required to achieve a particular standard must also be carefully considered. For example, whereas it might be relatively easy to move from T+5 to T+3 by simply imposing more discipline on all system participants; more fundamental changes (process re-engineering) in all aspects of the system are likely to be necessary to move to T+2 or T+1.

The profile of market investors (retail vs. wholesale, amount of foreign investment) as well as their intermediaries should be taken into account as this can influence the practicality of the targeted clearing and settlement cycle. Appropriate trade-offs between risk, cost, and convenience must be made, else the system will not satisfy user requirements at an affordable and acceptable cost and thus might constrain market development.

Another widely recognized concept is that trade matching should occur as soon after the trade as possible. G30 recommended that trade comparison should be accomplished by T+1. In addition, G30 recommended that indirect market participants – institutional investors and custodians -- should

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<sup>30</sup> *The content of the government securities and cooperation within the payments systems sections are based on the work that the payments team developed in the assessment of Trinidad & Tobago systems in the context of the WHI. The team was coordinated by Massimo Cirasino (WB) and included Paolo di Blasi (Payments System Consultant), Paola Giucca (Bank of Italy) and Derrelle Janey (Federal Reserve Bank of New York).*

<sup>31</sup> *Currently, there is a debate about the adequacy of moving the settlement cycle to T+2. However, given the globalization process in financial markets, there is an increasing necessity to standardize this process at an international level, even if this could imply that some countries should increase their settlement cycle.*

be members of a trade comparison system that achieves positive affirmation of trade details. Moreover, there should also be an integration system for trade matching, comparison and book-entry settlement of securities and funds. An automated link between the Exchange/OTC and the CSD is generally considered to be desirable and is a prerequisite for broker/dealer straight through processing from execution to settlement. Likewise, when clearing and depository services are provided by different entities, it is recommended that these two functions are closely tied together, otherwise finality of settlement is difficult to achieve. Fortunately, the cost of implementing automated systems is reducing, however, care should be taken to ensure that sufficient transaction volume exists and that users are willing to pay for the automated services based on tangible benefits in terms of efficiency or risk reduction.

Intra-day processing cycles are a good indicator of the processing efficiency of a settlement system. In essence, periodic settlement is better than a single end of day settlement mechanism. The greater the number of intra-day clearing cycles, the greater the flexibility it gives to the user. In addition, multiple processing cycles facilitate the effective linking of settlement systems, particularly across time-zones.

Because of increased automation and globalization of securities markets, it is beneficial from an interconnectivity perspective for domestic systems to use internationally recognized securities identification numbering standards. With this in mind, the G30 recommended that all markets should adopt a numbering system that meets the International Securities Identification Number (ISIN) standards.

To facilitate comprehensive coverage, especially from a market price perspective, it is also desirable that regulators encourage the development of a settlement procedure for off-market trades. These procedures should be similar if not the same as for the regulated market executed trade.

Finally, specific attention should be given to the need to achieve one of the acceptable forms of DvP through appropriate linkages with the national payment systems.

## 2. Settlement Risks

*Objective: To achieve final and irrevocable DvP and achieve efficiency and safety in the overall settlement process.*

The important issues of efficiency and flexibility have been touched on previously. The safety of the system is paramount from a participant and a regulatory perspective and should be given specific attention. The settlement process exposes market participants and clearance and settlement systems to different risks (see topic 4). The system should be designed to minimize these risks.

The major settlement risk is counterparty risk. DvP is one of the primary means by which a market can reduce the risk inherent in securities transactions. The DvP concept seeks to eliminate principal risk from securities transactions by ensuring that sellers give up their securities if, and only if, they receive full payment and vice versa. There are three essential elements in a DvP transaction: (a) good and irrevocable delivery of securities, (b) final and irrevocable funds, and (c) simultaneous exchange. The CPSS of the BIS has identified three different models of DvP.<sup>32</sup> Although these models vary in their approach to achieving DvP, all three models meet the concept of real DvP.

An important related concept is settlement assurance. This can be defined as the arrangement by which a system seeks to remove counterparty risk (principal, replacement cost, and liquidity risk) from its

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<sup>32</sup> Vid. Delivery versus Payment in Securities Settlement Systems, 1992, CPSS, BIS.

participants.<sup>33</sup> Settlement assurance can be achieved in different ways including novation, legislation or government rules and rules and regulations issued by CSDs and exchanges. It is important that the system provides information that facilitates the monitoring and management of exposures at all times. Well designed information systems are essential ingredients and must be embedded in even the simplest of systems.

There are a variety of risk management procedures to reduce market risk and strengthen a DvP mechanism (see table 3). Those procedures include admission standards, member's creditworthiness monitoring, novation, participation funds, collateral, margins, buy-ins and sell-outs, net debit caps, bilateral credit limits and loss sharing arrangements. Most settlement systems use more than one procedure to minimize market risk. In addition, there are a number of mechanisms designed to improve the settlement process. Among them are: central lending facilities; pledge recording facilities and prompt re-registration procedures. Properly regulated securities lending and borrowing can bring significant benefits to a market and its users leading to more liquid markets. Short selling could be a useful mechanism to add liquidity. However, when short selling is permitted, regulation must guard against manipulative practices, including those associated with a significant short position.

Systems that are considering implementing RTGS or netting should carefully study market volume and participation to determine if these mechanisms are appropriate (see topic 3). Historically, netting was introduced as an efficient measure to reduce the amount of physical documents passing between market members. Later, with the introduction of early computer systems, it was used to reduce the number of electronic settlements. Today, with high speed and powerful computers and the introduction of RTGS systems, the efficiency advantages are less important. Thus, the debate is focused on the trade-off between liquidity requirements and risk mitigation as discussed previously in this paper.

Settling in same day funds<sup>34</sup> is essential when operating in an RTGS environment and is useful in achieving real intra-day DvP. In order to achieve timely and risk-free settlement in same day funds, efficient banking arrangements will need to be developed that will enable funds to be moved quickly and relatively inexpensively. As payments systems are normally under the jurisdiction of the national central bank, cooperation in the area of payments system and securities system integration by regulatory authorities is very important to ensure that the banking system can support the securities clearance and settlement system. An important issue that inevitably arises relates to payment system access, and especially the way in which a CSD has access (direct or indirect) to the payments system. This is not a simple issue to resolve. Central banks typically are not in favor of allowing a non-bank to have direct access to a large value transfer system and the associated central bank provided liquidity arrangements. Some form of compromise can however be reached providing that decisions are taken that are in the best interest of the whole financial sector. For example, a CSD might be allowed to have a settlement account at the central bank but not have access to central bank credit.

Finality of both payments and securities' ownership transfer is a crucial factor in the development of a securities market. Otherwise, only local investors will operate in the market based on well established client relationships and the confidence that this provides. In emerging markets, this factor is of critical importance if there is a desire to attract foreign investment. Foreign investors will be reluctant to

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<sup>33</sup> *There are two types of arrangements that are typically referred to as settlement assurance schemes. One is used to guarantee the payment of net payments obligations arising out of a settlement system. The other is used to guarantee the settlement of transactions that have not yet reached their settlement date (future settlements).*

<sup>34</sup> *Payment is made in "same day" funds when payment of such funds is made on an irrevocable basis to the counterparty on the day of settlement such that they are available for use on the day of settlement.*

participate in a market that is not considered to be safe and sound. Securities finality is difficult to achieve, even with securities immobilization and dematerialization. For example, bearer or registered securities could be forged and the problem not identified until the bearer security is redeemed or the registered security lodged with the registry. Payments finality is equally important. The separation of oversight functions between the securities market regulator and the payments system regulator should not present insurmountable problems. An acceptable solution can always be achieved through discussion and resolution of conflicts even if this implies compromise.

### **3. Legal issues**

*Objective: To establish sound legal basis that is also able to accommodate technological advances in the operation of the system.*

A variety of laws and legal concepts can effect the performance of clearing and settlement systems. Contract laws, company laws, bankruptcy and insolvency laws, custody laws and property laws may impede the performance of a clearing system. Some of the legal aspects have been mentioned in relation to other main issues. The general need is to have an adequate legal basis that is able to accommodate technological advances and, in this way, does not constitute a constraint for the operation or future development of the system. Also, the lack of legal recognition of certain concepts such as nominee<sup>35</sup> or fungibility<sup>36</sup> may limit a system's ability to protect itself from certain settlement risks. If a system is using a netting scheme to clear and settle transactions, a sound legal basis for netting including the legal recognition of novation should be in place.

Another important emerging issue is the legal status of digital signatures. If digital signatures are to substitute for handwritten signatures, they must have the same legal status as handwritten signatures, i.e., they must be legally binding. Finally, procedures for creating and enforcing a pledge of interests in securities should be simplified in order to encourage the collateralization of credit exposure in an immobilized or dematerialized system.

As mentioned earlier in this paper, a critical need is to ensure that laws are both enforced and are enforceable in all relevant jurisdictions. In addition, disputes should become the subject of court proceedings only as a last resort. This can be achieved through the specification and acceptance of comprehensive and fair arbitration processes that are clear and non-ambiguous.

### **4. Regulatory Oversight Issues**

*Objective: The system for clearance and settlement of securities transactions should be subject to regulatory oversight, and designed to ensure that it is fair, effective and efficient and that it reduces systemic risk.*

Regarding regulatory oversight by the authorities, a specific allocation of responsibility for securities clearance and settlement supervision would be ideal. However, in most cases, this function is performed together with the general supervision of the participant entities without any special attention being given

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<sup>35</sup> A nominee is a person or entity named by another to act on his behalf. A nominee is commonly used in a securities transaction to obtain registration and legal ownership of a security. Legal ownership is the recognition in the law as the owner of a security while beneficial ownership/interest is the entitlement to receive some or all of the benefits of a security (e.g., income, voting rights, power to transfer).

<sup>36</sup> Fungibility is the method of holding securities by a CSD in which the owner of a security has the right to a certain amount of this security in a fungible pool and not to any particular physical or dematerialized security.

to clearance and settlement issues. There is a trend towards regulatory oversight policy being implemented at two levels that is substituting for traditional direct supervisory activity. The regulator conducts the oversight of the Self-Regulatory Organizations (SROs) (CSDs, exchanges) activities, while these institutions perform the same function with regard to its participants.<sup>37</sup>

A securities regulator should have the authority to license central clearinghouses and CSDs (System Operators) as SROs and review and approve their rules. As an SRO, a system operator should have the authority to make and enforce rules on its participants. The securities regulator should have the power to issue the guidelines that system operators should follow. In addition, the securities regulator should assure that the rules and procedures issued by SROs permit a sound and effective operation of the system and provide fair access to all market participants. The securities regulator should also have the authority to conduct periodic inspections, require the production of periodic reports and enforce the securities laws and regulations.

However, if the regulatory authority is a service provider, the potential conflict between this operational activity and its oversight role should be considered. This conflict is more important in payments clearance and settlement systems where the central bank operates systems that might be viewed as competing with the private sector. In the securities context, government securities clearance and settlement services are sometimes operated by central banks but normally without competing with the private sector.<sup>38</sup>

## **5. Clearing and settlement institutions and their participants**

*Objective: To take advantage of economies of scale.*

It is widely accepted that a securities market should be supported by the CSD with the broadest possible industry participation. Admission should be open to all qualified market participants needing access to the CSD.<sup>39</sup>

Membership standards for system operators should be established in order to minimize risk. Certain minimum standards of financial responsibility, operational capacity (including system security and integrity), experience and competence should be prescribed for participation in the systems. Mandatory capital requirements for participants are the first safety net to mitigate against a participant failure and, thus, an important risk management tool. However, these requirements are frequently established for reasons other than clearance and settlement and a system operator should have the authority to impose higher financial standards on its members/participants if the general requirements do not cover adequately the perceived risks.

The rules for clearing and depository organizations should avoid unfair discrimination in regard to the admission of participants or among participants in the use of the system. The rules should provide fair procedures for review of decisions concerning denials of access. In addition, the system should provide participants with a meaningful opportunity to participate in the administration of the organization's affairs.

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<sup>37</sup> For a complete analysis of regulatory oversight in payments systems vid. Banca d'Italia, November 1999, White Paper on Payment System Oversight.

<sup>38</sup> For a detailed analysis of oversight issues vid. Banca d'Italia, November 1999, White Paper on Payment System Oversight: Objectives, Methods, Areas of Interest.

<sup>39</sup> The cost is an important element to consider in order to avoid an unfair situation for the minority investor. In any case, transactions cost per unit should be clearly identified.

## 6. Safeguard Policies

*Objective: To safeguard securities, funds and all associated records.*

Securities clearance and settlement operators must have a demonstrable capability to safeguard securities and funds in their custody or control or for which it is responsible, and for protecting against reasonably anticipated internal or external threats to the integrity of its operations. In many markets, settlement is carried out and controlled through automatic data processing systems. In these cases, the system should have appropriate procedures to back-up data and a contingency plan to minimize disruptions.

Electronic technologies now in place or under development, such as the use of internet for initiating financial transactions increase consumer choice but at the same time provide additional means for abuse and illegal activity. Safeguards should anticipate, and be designed to provide protection against the possibility of theft, accidental or malicious destruction or loss of securities or funds and the possibility of accidental or intentional, but unauthorized, modification, disclosure or destruction of data.

In connection with these objectives, the organization should have an adequately staffed internal audit department which has the authority to review, monitor, and evaluate the organization's system of internal controls and the integrity of the operational procedures.

In summary, particular attention is required to reduce fraud. Some of the issues to be addressed are: (a) the operational security of systems including identification systems, message authentication and protection measures in safeguarding access to the system; (b) to ensure protection against insider fraud; (c) to have a regular independent audit of the systems to ensure continued system integrity; and (d) the determination of liability for loss or technical failure.

## 7. System capacity

*Objective: To provide the system with an adequate operational capacity.*

The central clearance and settlement system should maintain an adequate capacity to process current and anticipated future transaction volume, including projected peak day and peak hour volume demands. To achieve this, the operator must: (a) establish formal current and future capacity estimates for their automated trade comparison systems; (b) conduct periodic capacity stress tests to determine the behavior of systems under a variety of simulated conditions; and (c) conduct independent annual reviews to assess whether these systems can perform adequately at their current and estimated future capacity levels.

Operational capacity must also be demonstrated to exist at the mandatory disaster-recovery site. Operators must also have in place a well designed and adequately tested mechanism for transferring system control to the back-up site in an acceptable time-frame without loss of data or unacceptable reduction in service levels.

# GOVERNMENT SECURITIES CLEARANCE AND SETTLEMENT

Government securities markets are of significant importance in a country's financial sector. Government securities are used extensively to carry out monetary policy through open market operations. Furthermore, in many countries government securities pricing provides benchmarks for wider financial markets. Frequently, an important objective of macro-financial policy is the development of a deep and efficient secondary market for government securities. In conjunction with appropriate primary market arrangements, such a market is able also to reduce the cost of financing for the government. Sound and efficient procedures for the trading of government securities are an essential element for the development



of this market. In many countries, a successful implementation of well designed clearance and settlement mechanisms has represented a key milestone in the development of the overall market. Due to the peculiar characteristics of the government securities market, in many countries central banks are involved or manage directly the clearance and settlement mechanisms as well as the book entry systems that record securities ownership. As mentioned previously, central banks frequently own and operate a nation's large value funds transfer system. Ownership of the book entry system as well as the funds transfer system facilitates implementation of intraday DvP arrangements.

The relative policy and operational role of the central bank, and the operational role of stock exchanges in regard to the government securities markets must be taken into account during any assessment of the overall securities market arrangements. This is of particular importance to financial system stability as trades in government securities tend to be of higher value as compared with equities trades.

### COOPERATION IN THE PAYMENTS SYSTEM

Effective cooperation among market participants and regulators is essential for the development of a sound and efficient set of national payment system mechanisms. The specific needs of the securities markets should be satisfied along with the needs of all other users.

A number of specific problems should be anticipated and resolved during the preparation of a national payments system vision designed to satisfy the needs of all users and not only the needs of the banks. Active involvement of all users in the decision making process will remove the potential for problems and will result in an agreed strategy, organizational arrangements, and operational procedures. Territorial differences between regulators should not get in the way of sound decision making and willingness to cooperate as this can lead to "sub-optimal" solutions that impact the system's reliability and efficiency.

### CROSS-BORDER SECURITIES CLEARANCE AND SETTLEMENT

A truly global securities market requires the establishment of efficient and automated international securities clearance and settlement systems to facilitate cross-border settlement. Furthermore, the inability to settle cross-border transactions could also have a domestic effect, and problems in domestic systems could have an impact on linked markets. The growing importance of cross-border settlement has significant implications for systemic risk. Most local domestic systems have been designed to meet local market needs. For this reason, an assessment of a country system should include an analysis of how cross-border transactions are settled if this type of trading is significant.<sup>40</sup>

In a cross-border trade, counterparties are located in different countries. A cross-border settlement takes place when the securities are settled in one country in a way that is different from the country in which one or both of the counterparties are located. Risks faced by cross-border participants present some particularities compared to domestic settlements and depend on the way that the transaction is processed.

There are several ways to effect a cross-border transaction:

- Through *direct access* to (membership in) the CSD in the country of issue, although CSDs normally prohibit foreign residents from becoming participants. Furthermore, even if direct

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<sup>40</sup> For a detailed analysis of issues and specific risks associated with cross-border securities settlement *vid. BIS, March 1995, Cross-Border Securities Settlements.*

access were allowed, it is unlikely that foreign residents would opt for this solution as the establishment of local banking arrangements would also be necessary.

- Through a *local agent*, perhaps still the most common method, that holds securities and settles trades for non-residents through an account it maintains for its customers at the local CSD.
- Many institutional investors use *global custodians* rather than local agents to settle their cross-border trades. A global custodian settles the non resident's trades in the local market through a local agent acting as its sub-custodian.
- The *International Central Securities Depository (ICSD)* settles the majority of their participant's trades on their own books under their own rules and operating procedures. ICSD also supports trades and financial transactions with other ICSDs and counterparties that settle their trades in the local markets.
- *CSD-to-CSD links* permit the interconnection of securities clearance and settlement systems in different countries without compromising the essential soundness and integrity of each national system. Different varieties of settlement and custody services for the linked entities exist. The FIBV<sup>41</sup> identified three types of models:
  - a) Cross-border links between two CSDs for delivery and receipt of securities without payment facilities.
  - b) Cross-border links as above with payment facilities.
  - c) Cross-border settlement links between two clearing organizations providing for trade accounting, securities settlement, custody and settlement facilities with each clearing organization linked to its national CSD.

Some of the specific problems that could arise in cross-border settlement are listed below:

- The involvement of multiple jurisdictions raise the issue of choice of law and conflict of laws that complicates the analysis of the legal environment and could introduce new sources of risk. This is especially important when collateralized intraday loans are provided as the choice of law and conflicts of law can introduce ambiguities about the effectiveness of the liens involved.
- There is a potential for foreign exchange settlement risk.
- A non-resident may need to maintain larger balances of cash and securities than a direct participant would in order to settle the same type of transactions.
- The use of local agents, global custodians or ICSDs may exacerbate custody risk due to further tiering of securities holdings.

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<sup>41</sup> Vid. FIBV, June 1989, Improving International Settlement.

- The settlement of back-to-back trades<sup>42</sup> by dealers that are not direct participants in the local CSDs creates difficulties in some settlement systems, and dealers are often forced to borrow securities or pre-position securities to meet delivery obligations.
- Direct and indirect links among CSDs and ICSDs could involve significant operational inefficiencies in the exchange of information between systems.
- Differences between the operating hours of the ICSDs and the operating hours and settlement practices (especially finality rules) of national payments systems and local CSDs require the ICSDs to make credit extensions to their participants that are of unusually large size and long duration.
- Authorities in a home country may not become promptly aware of a disturbance to a cross-border settlement arrangement. Furthermore, once a problem becomes apparent, a high degree of coordination among several authorities in the home country and in other jurisdictions is required. The important role of international intermediaries in a cross-border settlement also complicates oversight of the domestic system.

The above factors should be taken into account when designing arrangements for cross-border settlement. In the case of direct and indirect links, linked entities should share a set of minimum standards in order to improve efficiency and reduce settlement risks.<sup>43</sup> In particular, they must carefully consider how differences in the rules and procedures of the linked systems affect settlement risks.

## CONCLUDING REMARKS

This paper has been written to evoke discussion and, therefore, should be viewed as a work-in-progress designed to provide input into the on-going work that is focusing on the development of core principles and minimum standards relating to integrated payments and securities clearance and settlement systems. It is an attempt to fill a current gap in the set of evaluation tools that are available to assessors of such systems, especially those that are required to assess evolving systems in developing and transitional economies. In particular, the authors will welcome comments relating to ways in which the Assessment Matrix illustrated in Annex I might be improved.

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<sup>42</sup> *A back-to-back trade is a pair of transactions that requires a counterparty to receive and redeliver the same securities on the same day.*

<sup>43</sup> *For a detail analysis of these minimum standards vid. IOSCO, July 1990, Clearing and Settlement, Report of the Technical Committee.*

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## ANNEX I. SECURITIES CLEARANCE AND SETTLEMENT MATRIX

<i>Relevant factors</i>	<i>Components</i>	<i>Standards</i>	<i>Status in the Country</i>	<i>Recommendations</i>
<b>1 - Clearing and Settlement processes:</b> ▪ Objective: to have prompt and reliable systems in processing trades, a cost-effective and a convenient system for its participants	1.1 Settlement cycle	- A market should achieve settlement by three days after trade date. (T+3), (G30-7)		
	1.2 Trade matching	- Trade matching should occur as soon after the trade as possible. All comparisons of trades between market participants should be done by T+1. (G30-1, IOSCO13.10) - If possible, automated links should be established between the trading system and the settlement system. (IOSCO13.10)		
	1.3 Trace confirmation / affirmation	- Institutional investors and custodians should be members of a trade comparison system that achieves positive affirmation of trade details. (G30-2, FIBV2)		
	1.4 System integration	- There should be an integrated central system for trade matching, book entry settlement of securities and book entry settlement of payments. (FIBV8.15)		
	1.5 Common message standard	- All traded securities issues should have had a security identification number that meets the International Securities Industry Numbering (ISIN) standards. (G30-9)		
<b>2 – Settlement Risk</b> ▪ Objective: Achieve final and irrevocable DP and improve the overall efficiency of the settlement process	2.1 Final and irrevocable delivery versus payment (DvP)	- DvP should be employed as the method for settling all securities transactions. (G30-5)		
	2.2 Same day funds	- Payments associated with securities transactions should be made in same-day funds. (G30-6) - The system should provide prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day. (CPIV)		
	2.3 Netting and real time gross settlement (RTGS) as settlement methods to reduce risk	- Netting and RTGS are effective settlement mechanisms. The regulator and market participants should study market volumes and participation to determine which mechanism is appropriate for their market place and have a clear understanding of the financial risks affected by the netting process. (IOSCO13.11.2, LII, CPII) - Multilateral netting schemes should have clearly defined procedures, ensure settlement in the case of inability to settle by the participant with the largest single net-debit position and have publicly disclosed criteria for admission which permit fair and open access. (LIII, LIV, LV, CPIII, CPV, CPIX)		
	2.4 Asset segregation	- The pool of securities or interests held in a depository should be protected against the claims of the depository's and broker's general creditors. (IOSCO2)		
	2.5 Settlement assurance procedures	- Margin requirements may be used in combination with other mechanisms to manage risk to market participants, clearinghouses and exchanges. (IOSCO13.11, EU6)		
	2.6 Liquidity risk	- Central clearing organizations and CSDs (System Operators) should maintain adequate sources of liquidity to meet their financial obligations on a timely basis. Reliance on one source may pose significant risks in the event of a financial crisis, and consideration should be given to diversifying liquidity sources to reduce such risks. The level of necessary liquidity sources should be based on an assessment of the risks to which the organization is subject and should be subject to regulatory review. (TC1.2, G30-8, IOSCO13.11.3)		

Relevant factors	Components	Standards	Status in the Country	Recommendations
	2.7 Short selling	- Short selling is regarded as a useful mechanism in some jurisdictions as an aid to liquidity. Where short setting is permitted, regulation must guard against manipulative practices, including those associated with a significant short position. In some jurisdictions this involves a combination of short sales and securities lending and restricting short sales to liquid stocks. Disclosure of short sales and securities lending positions (or, at least, their reporting to the regulator) is a tool for the further reduction of risk. (IOSCO 13.11.3)		
	2.8 Securities borrowing	- Securities lending and borrowing should be encouraged as a method of expediting the settlement of securities transactions. There is a legitimate and important role for securities lending in those markets that permit short selling. (TC2.3.8)		
<b>3 – Legal issues</b> ■ Objective: Sound legal basis that is also able to accommodate technological advances in the operation of the system	3.1 Netting (legal basis)	- There should be sound legal basis for netting including the legal recognition of novation. (L1, CPI, EU1, FIBV5)		
	3.2 Clear definition of property rights	- There should be a clear legal definition of securities property rights. (EU1a, IOSCO1, CPI)		
	3.3 Bankruptcy and insolvency laws	- The pool of securities of interests held in a depository should be protected against the claims of the depository's and broker's general creditors. (IOSCO2, CPI)		
	3.4 Electronic documents and signatures	- The law should recognize electronic documents and signatures to facilitate securities trading clearing and settlement. (CPI)		
	3.5 Conflicts of laws	- There should be clear mechanisms to resolve legal uncertainties and conflicts. (IOSCO4, CPI)		
	3.6 Pledging	- Procedures for creating and enforcing a pledge of interests in securities should be simplified in order to encourage the collateralization of credit exposure in an immobilized or dematerialized system. (IOSCO5)		
<b>4 – Regulatory oversight issues</b> ■ Objective: The system for clearance and settlement of securities transactions should be subject to regulatory oversight, and designed to ensure that it is fair, effective and efficient and that it reduces systemic risk	4.1 Regulation of central clearinghouses and CSDs as SROs	- The system for clearance and settlement of securities transactions should be subject to regulatory oversight and designed to ensure that it is fair, effective and efficient and that it reduces systemic risk. (IOSCO13.9) - The securities regulator should have the authority to license System Operators as SROs and review and approval their rules. (COSRA4) - The participants should be subject to supervision by a governmental authority or self-regulatory authority subject to governmental oversight. (COSRA1) - As a SRO, a central clearinghouse or CSD should have sufficient organizational structure and capacity to enforce its rules and the securities laws and regulations. (TC1.3)		
	4.2 The authority to issue directions (orders and directives)	- The securities regulator should have the power to issue directions (orders and regulations) regarding the clearance and settlement of securities transactions and clearing and settlement participants. (IOSCO13.9)		
	4.3 The authority to inspect regulated entities and enforce securities laws and regulations	- The securities regulatory authority should have the authority to conduct periodic inspections and require reports and enforce securities laws and regulations. (COSRA3, IOSCO13.9)		

SECURITIES CLEARANCE AND SETTLEMENT SYSTEMS

<i>Relevant factors</i>	<i>Components</i>	<i>Standards</i>	<i>Status in the Country</i>	<i>Recommendations</i>
	4.4 Governance of clearinghouse and CSDs	- A System Operator should provide its participants with a meaningful opportunity to participate in the administration of its affairs. Participants should have a fair voice in the manner in which decisions are made. Participants should be kept adequately informed of proposed rule changes and should be furnished with annual audited financial statements, an audited annual report on internal controls and other relevant reports on a regular basis. (TC 1.5, CPX)		
	4.5 Adequacy of Resources to perform oversight responsibilities	- The securities regulator should have sufficient staff capability with appropriate knowledge and skills to perform its oversight responsibilities. (IOSCO 13.8-13.9)		
<b>5. Clearing and Settlement Institutions and their participants</b> <ul style="list-style-type: none"> <li>Objective: Take advantage of economies of scale of settlement procedures</li> </ul>	5.1 Central Securities Depository (CSD)	- A CSD should be in place, and the broadest possible industry participation should be encouraged. A CSD's principal function is to immobilize or dematerialize securities, thereby assuring that the bulk of securities transactions are processed in book-entry form. The depository system provides the basis for achieving efficient and low risk transaction settlements. The most important feature of the book-entry method is that a transfer of a given quantity of an issuer from one account to another can be affected by a simple debit or credit on the books of the CSD. Other important features include trade clearance, safe custody, and settlement/post settlement processing of securities and information, such as corporate actions and dividend/interest processing. (G30-3)		
	5.2 Membership Standards	- There should be an appropriate balance between the need for system security and broad participation in the clearing and settlement system. (COSRA1, LV, CPIX, EU5)		
<b>6. Safeguarding Issues</b> <ul style="list-style-type: none"> <li>Objective: Safeguarding of securities and funds under its control and associated records</li> </ul>	6.1 Integrity of records	<ul style="list-style-type: none"> <li>- A System Operator should be capable of protecting against reasonably anticipated internal or external threats to the integrity of its operations. (COSRA5)</li> <li>- A System Operator should have appropriate procedures to back-up data. (TC 1.1)</li> <li>- A System Operator should develop contingency plan to minimize disruptions. (TC 1.1)</li> </ul>		
	6.2 Safeguarding of securities and funds	- A System Operator should have sufficient safeguards to ensure the safety of funds and securities under its control. (COSRA2, EU3)		
<b>7. System Capacity</b> <ul style="list-style-type: none"> <li>Objective: Provide the system with an adequate operational capacity</li> </ul>	7.1 Operative capacity	<ul style="list-style-type: none"> <li>- A System Operator should maintain adequate capacity to process reasonably anticipated volume, including projected peak volume demands. A Systems Operator should establish formal current and future capacity estimates, conduct periodic capacity stress tests, and conduct independent annual reviews to assess whether these systems can perform adequately. (COSRA5)</li> <li>- A System Operator should have back up systems and contingency plans on how it will operate in the event of computer failure or if the computers are unavailable because of a disaster. A System Operator should periodically test these back up systems and plans. (TC 1.1, CPVII)</li> </ul>		



## ANNEX II: LIST OF STANDARDS AND BEST PRACTICES

This list is not intended to be a comprehensive listing of all the existing standards and best practices related to securities clearance and settlement systems. The references are presented below by institution in alphabetical order, indicating the web site where the document is directly available or there is information on how to access it. The list also includes some documents that were used to design the structure of the matrix even if there is not a direct reference to them in the matrix.

### **Bank of International Settlements, BIS ([www.bis.org](http://www.bis.org))**

- *Minimum standards for cross-border and multi-currency netting and settlement schemes (Lamfalussy minimum standards)-1990*  
Reference in the matrix: L I-VI
- *Delivery versus payment in securities settlement systems*, September 1992.
- *Real-time gross settlement systems*, March 1997.
- *Core Principles for Systemically Important Payment Systems*, December 1999.  
Reference in the matrix: CP I-X

### **Council of Securities Regulators of the Americas, COSRA**

- *COSRA principles of clearance and settlement -1996*  
Reference in the matrix: COSRA 1-5

### **European System of Central Banks (ESCB) ([www.ecb.int](http://www.ecb.int))**

- *Standards for the use of EU securities settlement systems in ESCB credit operations -1998*  
Reference in the matrix: EU 1-6

### **Group of Thirty, G30 ([www.group30.org](http://www.group30.org))**

- *Group of thirty recommendations regarding securities clearance and settlement (G30)-1989.*  
Reference in the matrix: G30 1-9

### **International Federation of Stock Exchanges, FIBV ([www.fivb.com](http://www.fivb.com))**

- *Clearing and Settlement Best Practices -September 1999*  
Reference in the matrix: FIBV

### **International Services Securities Association, ISSA ([www.issanet.org](http://www.issanet.org))**

- *G30/ISSA Recommendations: 1997 Status Review*, November 1997

**International Organization of Securities Commissions, IOSCO ([www.iosco.org](http://www.iosco.org))**

- *Clearing and Settlement, Report of the Technical Committee*, July, 1990.  
Reference in the Matrix: TC
- *Clearing and Settlement in Emerging Markets — A Blueprint, Report of the Development Committee (now called the Emerging Markets Committee)*, October 1992.
- *Short Selling and Securities Lending: Issues for Consideration, A report by the Emerging Markets Committee*, May 1997
- *Towards a Legal Framework for Clearing and Settlement in Emerging Markets, Report of the Emerging Markets Committee*, November 1997.  
Reference in the Matrix: IOSCO1-5
- *Objectives and Principles of Securities Regulation, Report of IOSCO*, September 1998.  
Reference in the Matrix: IOSCO13.8-13.11

**Organization for Economic Cooperation and Development (OECD) ([www.oecd.org](http://www.oecd.org))**

- *Systemic Risks in Securities Markets*, OECD Publication Service, Paris, 1991.

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